

Closing the Gap





ALEKS[®]

Closing the Gap: From Course Placement to Completion

Every student has different needs and enters college with varied levels of preparation. Rooted in research and analytics, ALEKS pinpoints what students already know, what they don't and, most importantly, what they're ready to learn next, putting them on a personalized and dynamic path to meet their unique goals.

With ALEKS Placement, Prep and Learning, students are accurately placed in a course where they can be successful, but they are also given a chance to review, refresh and place higher. Once in their course, students fill their own unique gaps to master and retain the course topics, building a strong foundation for their next course.

Prepare & Accurately Place

6 hours

Students who spend an average of 6 hours in the Prep & Learning modules often place one course higher

22.5% increase

in student retention from year 1 to year 2 for students using ALEKS PPL (Placement, Prep and Learning)

—Harper College, IL

Personalize & Motivate

94% average learning rate

Students learn topics at an average rate of 94% where ALEKS deems they are ready. They won't waste time on topics they already understand or get frustrated by topics for which they lack the foundational background.

Success in college

begins with appropriate course placement. A student's first math course is critical to that success.

Master & Retain

15% increase in success rates

—Clemson Univ, SC
Placement and Math Course

21% increase in STEM enrollments

—Iowa Central CC
Placement and Math Course

10% decrease in DFW rate

—Univ of Toledo, OH
Chemistry

16% increase in success rates

—Cedar Valley College, TX
Math Course

Expedite Completion

670 more students passed College Algebra in less time

—Arizona State Univ
Placement and Course

\$1,000,000 saved in tuition

—Utah Valley University
Placement and Math Course

—Arizona State Univ
Math Course

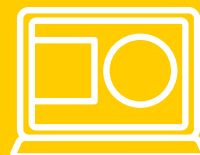


High School Partnerships to *Ensure College Readiness*

- Dual Enrollment
- College Readiness Courses
- Articulation: K-12 to post-secondary

Accurate Course Placement to *Drive Student Success*

- Accurate Placement
- Skill Refreshment
- Placement Bridge Programs



ALEKS offers Flexible Solutions from **College Readiness through Completion**

Our ALEKS product offerings support college readiness, placement, prep and course design to support institutional goals and improve outcomes.

Bridge/ Boot Camps to *Prepare Students*

- ALEKS Prep for Beginning Algebra through Prep for Calculus
- ALEKS Prep for General Chemistry & Organic Chemistry

Course Redesign to *Accelerate Learning*

- Co-requisites
- Math Pathways
- Blended, Lab-based, or Face to Face
- Competency-Based
- Active Learning



ALEKS=Equity.

Everyone starts at a different place.

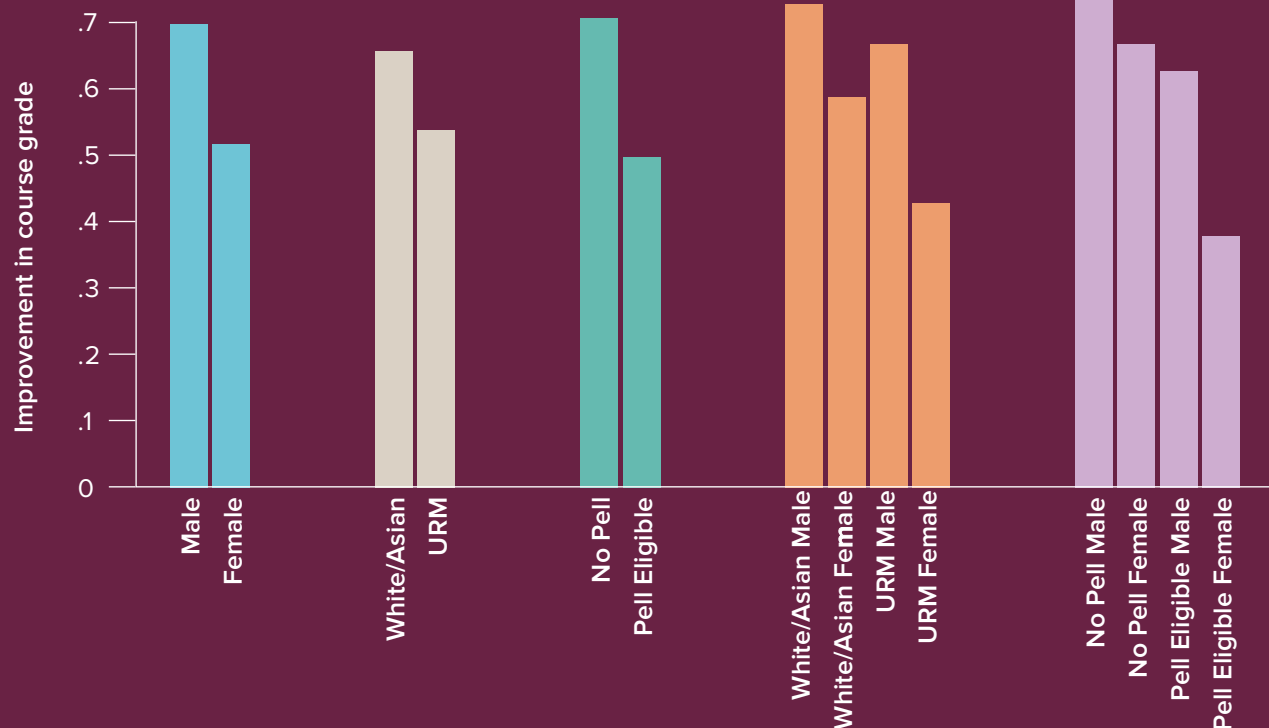
ALEKS gives all students the opportunity to finish at the same place.

Arizona State University

Researchers at ASU's Action Lab and Cornell University analyzed ASU's College Algebra students by demographic and saw gains across gender, ethno-racial, and socioeconomic groups when the course was taught with ALEKS (2016 and 2017 AY) compared to before (2014 and 2015 AY).

This graph shows improvements in the course grade (A=4, B=3, ...) for students with different sociodemographic backgrounds. The average grade increased by 2/3 of a letter grade (e.g. B to A-), corresponding to a 63% increase in A and B grades. After introducing ALEKS, more students go on to take a subsequent Calculus course and succeed at the same rate as before.

ALEKS Helps Students of All Ethnicities and Genders

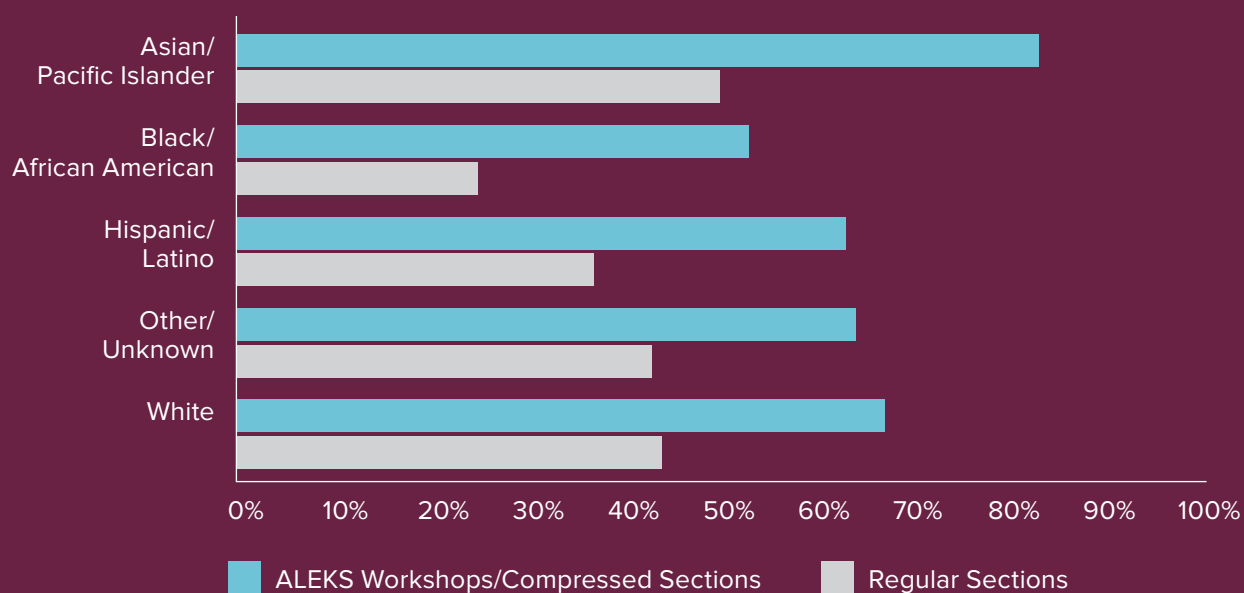


Kizilcec, R.F. & Fikes, T.G. (2019). Unpublished manuscript, Arizona State University.
URM (Underrepresented Minorities)

Long Beach Community College

All student groups in ALEKS or compressed sections of Math 110 (Beginning Algebra) outperform regular course section groups in the 2015-16 academic year. The gains range from 20% to 33% across the groups. Black/African American students are twice as likely to pass an ALEKS/compressed section than a regular section (using print or traditional online homework). The ALEKS classrooms follow a flipped approach (learning is outside of class and practice is in class) and the Compressed sections are 8 weeks instead of 16 weeks.

Math 110 success rates for ALEKS/compressed compared to regular sections for the 2015–2016 academic year by race/ethnicity



Long Beach CC Office of Institutional Effectiveness, 2016

City College of SF— 12% increase

2017 Latinx Summer Bridge students not only beat the average course success rate for new students, they had **12% higher course success rates vs. all Latinx students in math.**

City College of San Francisco's Summer Bridge Program students are placing higher and exceeding average course success rates. For math, CCCSF students received math instruction and used ALEKS PPL.



Proven Platform + Superior Support= Breakthrough Results

McGraw-Hill is committed to improving outcomes across a wide range of institutions and implementation models-- from placement through completion. The following case studies are a sampling of institutions that have reached and scaled their course goals.

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ALEKS® Case Study

Arizona State University

Tempe, AZ



Introduction

In 2013 Arizona State University (ASU) identified a growing trend of more students placing into their lower-level mathematics courses, namely Freshman Enhanced Mathematics (MAT 110). While ASU was dedicated to supporting these students, they were also concerned that their success in MAT 110 was not translating into success in College Algebra (MAT 117). Pass rates in College Algebra were stalling at around 60 percent. This led faculty to reconsider the learning tools for Enhanced Freshman Math and College Algebra.

ASU tried a number of instructional systems for the Enhanced Freshman math and College Algebra courses prior to evaluating ALEKS. While students were able to progress at their own pace, their efforts were not meeting ASU's expectations for improved success on exams.

The inadequate progress, along with the desire to get more students through College Algebra, drove ASU to seek alternative software to deliver course material.

ALEKS Experience

After evaluating the courseware options and pedagogical considerations, faculty decided to pilot ALEKS in the College Algebra course for the summer of 2016. As part of the preparation for the pilot, the faculty tried ALEKS as students. They saw the benefits of its adaptive nature and built-in motivation and realized that this would be a more personalized experience for their students.

Case Study Course/Term: Math 117
College Algebra / Academic Years
2015-2017

Implementation: 16-week; Blended
(Lab + Group Work)

Course Setup: ALEKS College Algebra
with Miller College Algebra, 2e

Average Enrollment: 3200 for Fall;
1000 additional in Spring

ALEKS Experience (cont.)

In the fall of 2016, ASU faculty launched two initiatives:

1. ASU would no longer offer Enhanced Freshman Mathematics. Students who would have placed into that course would enroll in College Algebra.
2. ALEKS would be implemented to remediate students who lack prerequisite skills in College Algebra.

College Algebra pass rates then increased after the first semester with ALEKS from 62% in the fall of 2015 to 67% in the fall of 2016, and again to 74% in the fall of 2017. Instructors were pleased that their initial hypothesis of lower pass rates was incorrect. ASU believes that ALEKS is a significant part of this success in College Algebra. The adaptive nature and algorithmically generated problems in ALEKS tailor the lessons so students are on their own individual path. The precision at which ALEKS can remediate students' prerequisite skills, as well as regular course content, led to a radical departure from the national practice of instructors lecturing students in class.

Implementation

ASU designed a blended model to support student learning in College Algebra. ALEKS Placement, Preparation and Learning (ALEKS PPL) is used to place students into the course, which is organized into cohorts of 25 students that are each managed by an undergraduate learning assistant.

The class meets three days a week in a lab to work in ALEKS. Once every two weeks students work on problem-solving activities in groups of 5-6 students. There are 18 ALEKS Objective assignments, each with a varying number of topics, and the first few Objectives are front-loaded with review topics. Grades are weighted according to the syllabus: ALEKS Pie progress = 20%, weekly ALEKS topic goals = 15%, exams = 50%, participation = 5%, problem-solving activities = 10%. Students receive a letter grade at the end of the semester.

The ALEKS reporting metrics are used to monitor student progress and identify those who are falling behind. Faculty can then help these students remediate effectively. Three tests and the final are in ALEKS and proctored by Software Secure's Remote Proctor Now, which is licensed by ASU. It is also important to note that ASU has supplemented the ALEKS system with instructional videos that have helped many students to learn the lessons in the courseware.

Institution Profile

Arizona State University (ASU) is a top-ranked, public research university that spans five campuses in the Phoenix metropolitan area, and four regional learning centers throughout Arizona. It serves over 100,000 students and graduates more than 20,000 thinkers, innovators and master learners every year. The university's charter is based on the "New American University" model created by ASU President Michael M. Crow, which defines it as a "comprehensive public research university, measured not by whom it excludes, but rather by whom it includes and how they succeed."

For the fourth straight year, U.S. News & World Report ranked ASU No. 1 on its "Most Innovative Schools" list.

"The interface is very intuitive and the appropriate metrics needed to identify student progress are readily available. These metrics make it very easy for instructors to identify students that are falling behind and then offer them the appropriate level of support to help them be successful."

– Doug Williams, Instructor & Adaptive Learning Coordinator

Consolidating Courses

Students who would have placed into Freshman Enhanced Mathematics now enroll directly in the appropriate credit-bearing courses and use ALEKS as the primary instructional tool. Students enrolled in College Algebra are encouraged to complete the course within one semester. Most students are able to complete in one semester what would have taken two semesters in prior years. However, instructors review all progress in ALEKS about two thirds of the way through the semester and determine which students may need more time to complete. This is often the case when a student spends a significant portion of the semester on remedial topics. After working with the ASU registrar, the math department developed a system to allow the struggling students to earn a “continuation grade” (Z) in their class and then finish College Algebra the following semester in a “stretch” course (117S).

Fall Semester Success Rates

Prior to using ALEKS, the College Algebra pass rates were often hovering around the 60th percentile. After ALEKS, student success in College Algebra jumped to 67% in the fall of 2016 and up to 79% in the fall of 2018; this is in spite of students who would have placed into Enhanced Freshman Math being mainstreamed into College Algebra (see Figure 1). The success rate for the fall of 2017 increases to 78% once the adjustment is made for the students who chose a Z grade and then completed the stretch course successfully. ASU also saw 670 more students pass College Algebra in the fall of 2016, compared to when Enhanced Freshman Math was a prerequisite the year before. An additional 280 students passed College Algebra within one year via the stretch course path.

Figure 1: College Algebra Data

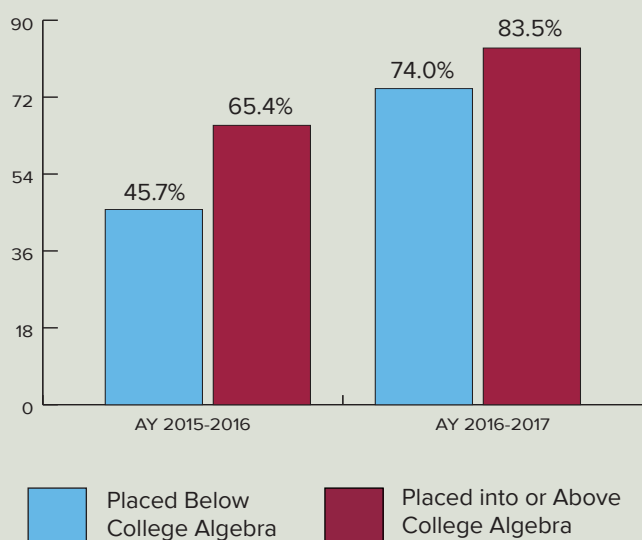
Fall Term	Pass Rate	Enrollment
2015	62%	1,655
2016*	67%	2,534
2017	74%	2,700
2018	79%	4,546

*First semester with ALEKS

Results

To determine the success of the new setup for College Algebra, ASU measured the pass rates of students for the fall semester, and then the pass rates of students who took two semesters to complete College Algebra via the stretch course (117S). This was done by noting the number of Z grades from the fall semester that converted into passing grades the following spring semester.

Figure 2: One Year Pass Rate for College Algebra Students



One Year Success Rates

Prior to ALEKS, students with low placement scores passed College Algebra only about 45% of the time, which is about a 20 percentage point gap compared to those with satisfactory placement scores (see Figure 2). In the academic year 2016-17, about 83% of the students with satisfactory placement scores passed while students with low placement scores eventually passed at a rate of 74%. This represents substantial improvement for both groups while also closing the achievement gap from 20 to 9.5 percentage points.

Results (Cont.)

The changes in enrollment numbers (see Figure 3) show that significantly more students are completing in one semester what many took over two semesters in previous years to complete. Not only does this show students saving time, but they are also saving money by only having to pay for one course instead of two. Within just one semester, students saved over \$1 million in tuition and course fees. Getting more students through College Algebra in less time is critical to achieving the goal to eliminate math as a “rate limiter” for student success in STEM and other areas of study.

Figure 3: College Algebra Enrollment

	AY 2015-2016	AY 2016-2017
Starting Enrollment	1,655	2,534
Pass in 1st Semester	994	1,644
Pass in 1st Year	1,575 (58%)	1,987 (78%)

Student Proficiency

ASU also uses ALEKS to measure the proficiency for each of the 380 learning objectives in College Algebra; the rule the faculty set is 90% mastery to move on to the next lesson. In the fall of 2016, students who completed College Algebra achieved 95.6% mastery. The technology to measure mastery at such a granular level did not exist prior to using ALEKS. The ASU faculty believes that improved student performance has largely to do with student use of the just-in-time resources in ALEKS. Students dedicated to learning really benefit from the adaptive design of ALEKS.

Student Reactions

Based on surveys and focus group feedback conducted by ASU, students in general like ALEKS. They like that the Knowledge Checks give them the opportunity to skip ahead in the content. They also find the system easy to navigate. Getting double credit in Learning Mode for getting multiple problems right in a continuous streak has been a big motivator for students. Instructors have noted that students are more proactive and take ownership of their success in the course, which they believe is attributable to the user experience in ALEKS.



Instructor Profile

Douglas Williams began teaching in Belize in 1981. He earned a Bachelor's degree in Secondary Education from University College of Belize, and a Master's degree in Statistics from Arizona State University. Professor Williams began teaching full-time at ASU in 2000 and as an adjunct at Gateway Community College in 2002. He has taught various undergraduate math, math education, and statistics courses using traditional, hybrid, online, and adaptive designs. Professor Williams also has served on various department committees for course redesign. Since 2012 he has been the Adaptive Learning Coordinator for all of the ASU College Algebra and College Math courses. He leads the team that implemented several adaptive platforms, including ALEKS.

“

ALEKS is a very motivational tool. I learned what was being asked of me. I had to repeat many topics, but that allowed me to really understand the steps to solving problems.

– Student, Arizona State University

ALEKS® Case Study

Cedar Valley College | Dallas, TX



Course Name: DMAT 0305 Developmental Math; DMAT 0310 Intermediate Algebra; MAT 1314 College Algebra

Implementation: Blended/Lab, Online

Course Setup: ALEKS 360 with Miller Beginning & Intermediate Algebra, ALEKS 360 with Miller College Algebra

Avg Enrollment: 505 students/semester in DMAT, 549 students/semester in College Algebra

Prior to Using ALEKS

The state of Texas changed the placement test and the rules governing it. In addition, several exemptions were added to math placement. These changes resulted in more underprepared students in mathematics classes, both developmental and college-level. We had been using MyMathLab for several years, but students with weak prerequisite skill and low confidence continued to struggle.

Why We Chose ALEKS

We were attracted to ALEKS because of the ability to roll prerequisites into the course and meet students where they are mathematically. We didn't know it then, but this became a key benefit when the State of Texas mandated we move to co-requisites. What 'sealed the deal' for us is the science behind the truly adaptive nature of ALEKS; the Ready to Learn paradigm is unique and allows each student to legitimately have their own learning path.

Our Experience with ALEKS

Our overall experience with ALEKS has been positive. It truly meets students where they are mathematically. Professor Mary Merchant noted, "I field fewer content questions from students, which, I believe, is because they are never presented with material they are not ready to learn." ALEKS has afforded us more insight into our students' progress, so that we can be more effective instructors. "It really shines the light on things we may not have been able to catch" boasts Merchant.

"ALEKS truly meets students where they are mathematically. The science behind the adaptive nature of ALEKS 'sealed the deal' for us."

– Mary Merchant, Professor

Implementation

In the on-campus class, students meet in a lab arranged in eight “pods” that each have three computers. Classes meet twice a week for 1 hour and 20 minutes. This redesign has allowed for consistency across all sections with 1 instructor and 1 tutor per section. Instructors are encouraged to facilitate planned or just-in-time mini lectures. The online course has students working through the material on their own. Grading is comprised of weekly topic goals (10%), 5 pie progress goals (45%), and 4 exams (which are Comprehensive Knowledge Checks in ALEKS, at 45%).

Results Achieved

For the past 3 years, pass rates have increased in all three course areas. Overall, Elementary Algebra saw an increase of 17.7%, Intermediate Algebra has increased by 15.8% and College Algebra by 13.9% (see Figure 1). As Professor Merchant states, “this growth is incredible considering slightly less than half of the students enrolled should have been in the lower developmental courses we no longer offer.” As students work in ALEKS, they are motivated to gain topics in their pie and visualize their growth, compared to completing traditional homework. Students appreciate the non-punitive approach to learning and are subsequently more engaged in class.

Figure 1: Fall Success Rates at Cedar Valley

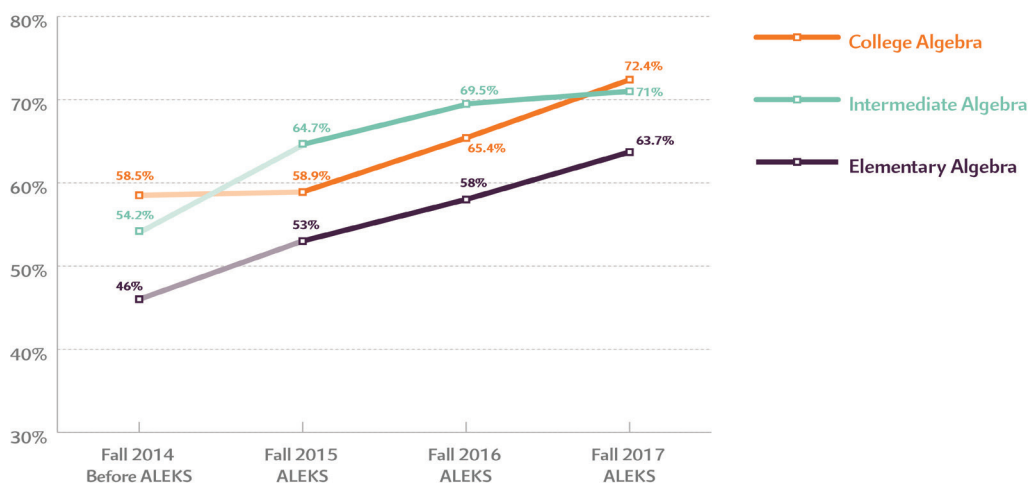


Figure 2: Enrollment by Course

Fall Term	Elementary Algebra Enrollment	Intermediate Algebra Enrollment	College Algebra Enrollment
2014 (Pre-ALEKS)	109	118	443
2015	195	119	510
2016	282	106	492
2017	371	134	549

Driving With Data

Beginning on day one with the Initial Knowledge Check, we are using data to facilitate a more positive experience in math. We can easily identify if a student is placed too low or too high, and celebrate the fact that they are receiving credit for topics they already know. This goes a long way in boosting their confidence and motivation.

We also utilize data from the ALEKS Pie Report to fuel our time spent with students. This quick snapshot of class performance can drive our lectures, group activities, or even 1-on-1 interaction. Students quickly learn that instructors are monitoring their progress in ALEKS to help maximize their time. Because ALEKS helps students take responsibility in their learning and interactions with instructors, we are prepared to take on future curriculum changes as we increase our co-requisite offerings.



“In general, students enjoy work in ALEKS. It doesn’t feel like homework, and they enjoy the organization of the ALEKS pie. Developmental students are not quick to offer unsolicited thanks to their instructors, but the lack of complaints this past semester is enough for me to know we made the right decision with ALEKS.”

—Professor Mary Merchant



ALEKS® Case Study

Clemson University | Clemson, SC

Why ALEKS was Chosen

Professor Eliza Gallagher started with a pass rate of ~45% and low student and instructor satisfaction. By incorporating active learning in each lecture and reducing class size, the pass rate rose to ~55%. Although this percentage was better, Gallagher still wanted to achieve a higher pass rate. Additionally, there was a particular urgency to improve the pass rate for the under-represented groups in the STEM majors. After implementing ALEKS, the students' pass rate climbed to 70%. Student satisfaction, student performance in subsequent courses, and instructor workload also improved.

Institution Profile

Clemson University is a major research university founded in 1889 and has been ranked as the 25th best national public university by U.S. News and World Report. The 17,000-acre campus has a total undergraduate enrollment of 15,836 students. Clemson University is a land-grant institution that conducts research for the benefit of the community and boasts a student-faculty ratio of 18:1.

Implementation

MthSc 105: Precalculus is a preparation course for the standard calculus sequence. The traditional course covered two-and-a-half years of high school math in 15 weeks. Class met six times a week and required two full-time faculty members and eight full-time graduate teaching assistants. After an initial course redesign, the pass rate increased slightly to 55%, the workload for faculty and students was

still high, and the satisfaction was low. Among students who passed, less than half continued in STEM majors.

To further improve results and retention, ALEKS was then implemented as a stand-alone model and the MthSc105 class was flipped. The “lecture” section became the online component and the lab sections became twice-weekly, face-to-face meetings for 75 minutes. Students are expected to spend 8-10 hours per week in ALEKS outside of lab. During the lab sections, mini-lectures are held for groups of three to 12 students at a time. To pass the course, students must attain 80% mastery in the ALEKS Pie, take two supervised comprehensive assessments, complete a worksheet, and earn a 70% or better on a written exit exam.



**Course: PreCalculus and Problem Solving
in Mathematics**

**Implementation: Course Redesign -
Flipped Classroom**

ALEKS Instructor: Eliza Gallagher

Enrollment: 30 Students per Term

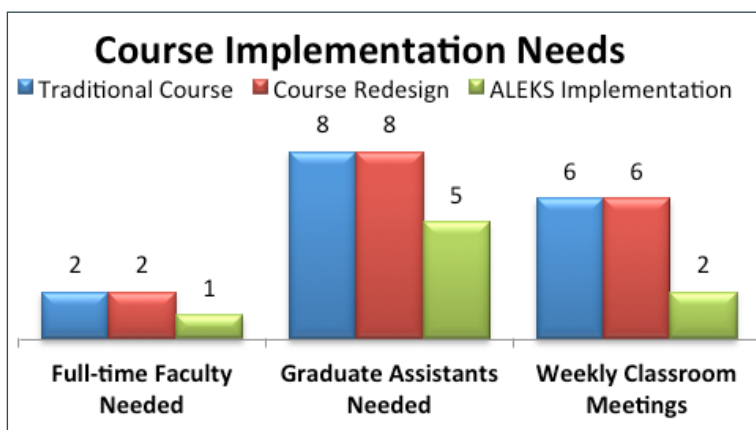
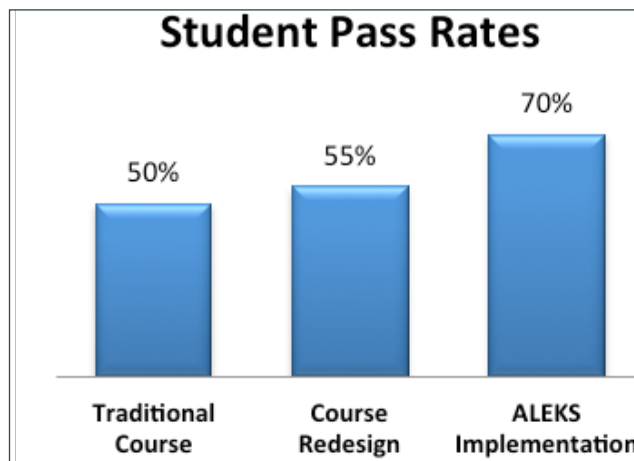
Results Achieved

After experiencing MyMathLab, Maple, MATLAB, Mathematica, and several different textbooks, ALEKS was implemented as a stand-alone model and the classroom was successfully flipped. With ALEKS, the course now has a 70% pass rate with students performing in subsequent courses at least as well as under the previous format. Additionally, staffing needs are being met with one full-time faculty member and five full-time graduate teaching assistants. Classroom space has been freed as a result of meeting twice a week instead of six times a week.

Conclusion

With ALEKS, students' pass rates have increased, success rates in subsequent courses have improved, and fewer instructors and classroom hours are necessary. Students prefer the flexibility in scheduling and the ability to work at their own pace. Further, because ALEKS adapts to individual student performance in real-time, Gallagher notes, "students are put in the position of having to face that their lack of progress is almost always a result of not putting in the work. And, those students who are putting in a lot of time but are not seeing progress can be identified quickly for individual intervention." Students agree.

Gallagher adds, "ALEKS allows you to focus on instruction and meeting the individual needs of your students while allowing the burden of assessment to fall on ALEKS. Clemson University will be adopting ALEKS for placement and will use the data from the ALEKS implementation in Precalculus to inform the initial cut scores."



I evaluated many different options, and ALEKS provided, by far, the best cycle of assessment and learning that allows for individualized instructional paths . . . no other program matches ALEKS."

– Prof. Eliza Gallagher

William Rainey Harper College

ALEKS PPL Significantly Improves Students' Placement and Performance in College-Level Math Courses

Institution Profile

William Rainey Harper College provides a community college education to more than 26,000 students annually in Chicago's northwest suburbs. Harper College offers associate degrees, certification programs, workforce training, and continuing education classes.

A Study to Evaluate Math Placement

Harper College used ACT's Compass math placement exam for over 20 years. To improve their course placement and success rates for students in college-level math courses, Harper College, in partnership with researchers from Vanderbilt University, conducted a controlled pilot of more than 1,000 students during the summer of 2014 and subsequently monitored student performance in math classes during the fall of 2014.

The pilot design and analysis were done by researchers at Vanderbilt University to allow for an independent, unbiased and data-driven assessment of ALEKS PPL relative to the student body. The ALEKS PPL product was used by students in the experimental study group and compared against a control group of students who utilized the ACT Compass assessment.

Implementation

Harper College requires degree-seeking students who do not have an ACT math score of 22 or higher from within the past five years to demonstrate their mathematical abilities by taking a math placement exam. The placement exam serves to place students from developmental math through Calculus I. The first assessment students take is proctored, and additional assessments are not.

Harper College requires that students use the ALEKS PPL Prep and Learning Module prior to reassessing. Students must spend three hours in the Prep and Learning Module in order to take the second assessment, and an additional three hours is required for a third attempt. A fourth attempt is available for students who spend an additional five hours in the Prep and Learning Module and, finally, eight additional hours are required for a fifth and final attempt.

Results

Students who used ALEKS PPL were 7–9% more likely to place in a college-level math course compared to the control group who used Compass. Additionally, students who used ALEKS PPL were 19% more likely to receive a “C” or better in their college-level course. Those students were also 22.5% more likely to stay enrolled at Harper College for a second semester (Figure 1). Although those who placed into developmental coursework earned similar grades as compared to the Compass control group, this still points to a positive outcome due to ALEKS students placing higher in the developmental course sequence as compared to Compass testers.

PLACEMENT COURSES: Developmental math, which includes Basic Mathematics, Beginning and Intermediate Algebra, and Data Modeling with Algebra, and into Collegiate Math

STUDENTS TAKING PLACEMENT: 3,500 students per academic year

CASE STUDY TERMS: Summer 2014 and Fall 2014



Results show that having to use the ALEKS PPL Prep and Learning Module prior to taking the exam does not deter students from re-taking the placement exam. In fact, students who used the Prep and Learning Module prior to re-taking the placement exam had a higher retest rate of 36% compared to students who used Compass (and were not required to participate in a learning module) who had a 32% retest rate.

Additionally, when students used the Prep and Learning Module prior to re-taking the placement exam, students improved their course placement scores and were more successful in the math course in which they enrolled (success is defined as earning a “C” or better). 82% of students who used the Prep and Learning Module increased their course placement on their reassessment as compared to only 36% of students who reassessed using Compass (Figure 2). Further, the use of the ALEKS PPL Prep and Learning Module increased the probability of a student passing the math course in which they enrolled by 10%.

Percentage of Students that Improved Course Placement After Reassessing

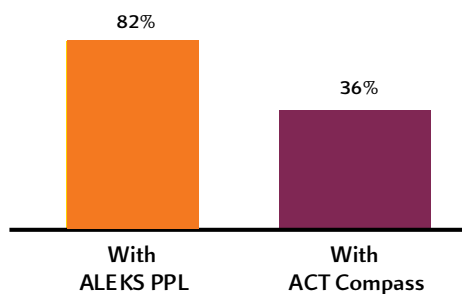


Figure 2

Results for Students Placing into College Level Courses (ACT Compass vs. ALEKS PPL)

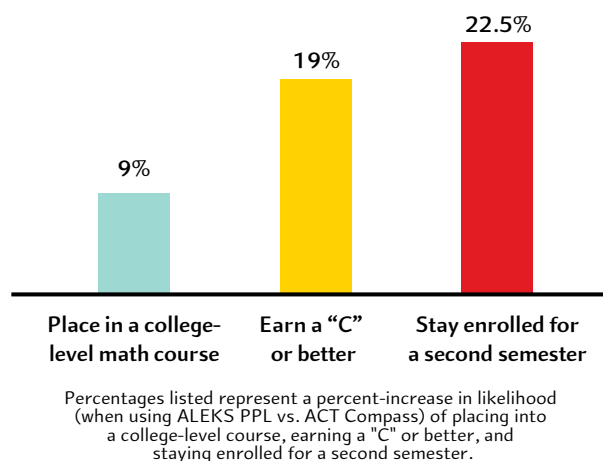


Figure 1

Conclusion

Harper College has adopted ALEKS PPL as the official college math placement program because students who used ALEKS PPL had higher level placements, higher success rates in college-level math courses, and were more likely to stay enrolled at Harper College for a second semester.

“Upon completion, students are provided a full and complete profile of their mathematical abilities broken out by 314 math concepts. ALEKS PPL not only provides a stable testing platform, but it is a placement exam and diagnostic tool all wrapped into a single student experience.”

–Matthew McLaughlin, Director, Title III & Testing Center

ALEKS® PPL Case Study

PLACEMENT, PREPARATION AND LEARNING

Iowa Central Community College

Introduction

About Iowa Central Community College

Iowa Central Community College was founded in 1966 and has just over 5,000 students enrolled. The main campus is in Fort Dodge, Iowa, along with four additional satellite campuses serving nine counties. Its mission is to provide quality educational opportunities in and outside the classroom. In October of 2017, Iowa Central created a STEMM division (science, technology, engineering, math, and medical) to meet the needs of the 21st century STEM initiative initiated by the state of Iowa's Governor Reynolds. It is committed to helping students excel in the areas of STEMM and serve its community. Professor John Hansen serves as the dean of this division.

Meet Professor John Hansen, Dean of STEMM Division

From a young age, I always enjoyed mathematics. But it wasn't until high school where my math teacher's enthusiasm towards the subject made me want to pursue the field as a college degree. Although I enjoyed the research aspect of mathematics, my goal was to pass the same enthusiasm for the subject I got from my high school math teacher to others. When I first started at Iowa Central, we had no placement requirements. We then adopted mandatory placement, but still had many students fail for a variety of reasons.

Whatever the case, we lacked the tools to determine what was happening until we adopted ALEKS PPL in the summer of 2014. Not only did we see an immediate increase in success, but we also gained a tool that helps us understand each student's knowledge state. Since our adoption, we have used ALEKS to redesign our developmental math sequence with a simple set of goals: increase student success, increase student retention, and decrease the amount of time students spend in developmental math.

"ALEKS PPL is the only assessment I know that measures a student's actual mathematical skill set. Not only does it measure their skill set, it also tells me exactly what they know and what they don't know, which is a game changer!"

— John Hansen, Dean of STEMM Division

Introduction (Cont.)

Before ALEKS PPL, Iowa Central Community College (ICCC) was not getting the results it wanted for students with its placement tools. Prior to 2000, advisors would suggest math courses appropriate to the skill set of the student, but students could enroll in any course for which they met the prerequisite. The high school GPA and/or the scores of the ACT, SAT, and Compass test were used as placement. This led to high failure rates and students repeating courses. Seeing the need for change, Iowa Central implemented mandatory placement in the fall of 2000, with Compass and ACT scores being the most commonly used placement tools.

Even though Iowa Central began to see some immediate improvement in student success and retention, it was not enough. College-level math course success rates was 8% for students who started in Fundamentals of Math, and 27% for those who started in Elementary Algebra. After 14 years of not getting the results it wanted, the school was ready to try something new. It began a pilot project with McGraw-Hill in the summer of 2014 to implement ALEKS PPL for placement. The pilot was part of a state-wide initiative to gather data concerning placement and success rates in math courses. Much of the decision to move to ALEKS PPL was due to retention concerns. Iowa Central were losing, on average, about 900 students from fall to spring, in part from them failing their math course.

Placement at Iowa Central from 2000–2014

Compass	ACT	AccuPlacer	Course Placement
P 0-33	0-15	20-48	MAT – O45 Fundamentals of Math (Developmental)*
P 34-63; A 0-50	16-19	49-90	MAT – 063 Elementary Algebra (Developmental)
P 64-100 or A 51-100 or C 0-50	20-23	91-103	MAT – 102 Intermediate Algebra (Developmental) MAT – 111 Math for Liberal Arts MAT – 117 Math for Elementary Teachers MAT – 140 Finite Math MAT – 156 Statistics (3 credit hr)
C 51-100 or T0-45**	24-27**	104-119**	MAT – 120 College Algebra MAT – 127 College Algebra with Trigonometry MAT – 130 Trigonometry MAT – 165 Business Calculus
T 46-100	28-36	104-119	MAT – 210 Calculus I

*Non-credit bearing course

**Plus a "C" or above in Intermediate Algebra

Implementation

Initial Setup

A single sign-on for ALEKS PPL was setup through the school's student portal TritonPass. Once a student applied to Iowa Central, they received a TritonPass username and password to access their grades, courses, financial aid info, and ALEKS PPL. It was simple to implement, with the help of ALEKS tech support. Additionally, Iowa Central worked with local high schools for them to help proctor the ALEKS PPL placement assessments. Because student scores are automatically uploaded to the administrative software, Datatel, it is no longer necessary to run separate weekly reports to update student records. To inform incoming students of ALEKS PPL, the school sends out a brochure containing the information they need.

How do I access ALEKS?

1. Triton Pass Log into your Triton Pass and click on the pocket lock. You will find a link for the ALEKS Assessment. Click on the link and follow the on-screen instructions.
2. If you are not a current student or you are not within Iowa Central's region, contact Amy Moffitt, Coordinator of Testing Services, moffittaj@iowacentral.edu, or call 562-674-1044.

A Proctored/Unproctored: The first assessment may be taken either proctored or unproctored. A proctored assessment means you are taking the assessment at an Iowa Central testing center or with an Iowa Central approved proctor. An unproctored assessment score will not count for placement.

1st Placement Score ☐ Date: _____

You must wait at least 24 hours before you can take the next assessment.

Prep & Learning Module Opened on: _____

2nd Placement Score ☐ Date: _____

You must work at least 5 hours in your Prep & Learning Module before you can take the next assessment.

3rd Placement Score ☐ Date: _____

You must work at least 5 hours in your Prep & Learning Module before you can take the next assessment.

4th Placement Score ☐ Date: _____

You must work at least 5 hours in your Prep & Learning Module before you can take the next assessment.

Still have questions?

ALEKS:
<https://www.aleks.com/support>
(746) 656-7090

Iowa Central Community College:

Amy Moffitt
Coordinator of Testing Services
moffittaj@iowacentral.edu
(562) 674-1044

John Hansen
Math Department Coordinator
hansen_j@iowacentral.edu
(562) 674-1045

Laura Walters
Developmental Math Coordinator
waltersl@iowacentral.edu
(562) 674-1028

SAVE

TIME and

MONEY

with

ALEKS

Mandatory Placement Assessment for Math



Cut Scores

Iowa Central worked with experts at ALEKS to define the cut off scores based on the topics covered in it’s course curriculums. As part of the pilot, the school ws required to submit data (scrubbed of personal information) to McGraw-Hill, which included the ALEKS scores used for placement, the courses in which students were placed, and students’ final grades in those courses.

ALEKS PPL Placement Cut Scores

Score Percent Range	Course Placement
0% – 13%	MAT – O45 Fundamentals of Math (Developmental)
14% – 29%	MAT – 063 Elementary Algebra (Developmental)
30% – 45%	MAT – 102 Intermediate Algebra (Developmental) MAT – 111 Math for Liberal Arts MAT – 117 Math for Elementary Teachers MAT – 140 Finite Math MAT – 156/157 Statistics (3 credit hr), Statistics (4 credit hr) MAT – 165 Business Calculus
46% – 75%	MAT – 120 College Algebra MAT – 127 College Algebra with Trigonometry MAT – 130 Trigonometry
76% – 100%	MAT – 210 Calculus I

Current Setup

ALEKS PPL offers each student five attempts at the placement assessment and six months of access to the Prep and Learning Modules. ALEKS PPL assessments are setup to be proctored. However, the first attempt can either be proctored or un-proctored, the latter of which does not count toward placement results. The average assessment attempt is 61 minutes, compared to only 13 minutes for Compass and Accuplacer.

The students must complete five or more hours in the ALEKS PPL Prep and Learning Modules before the third attempt at the placement assessment, and again before the fourth and fifth attempts. Once a student takes their first ALEKS PPL assessment, the Prep and Learning Module is then created based upon the student’s individual skill level. Since initial implementation, approximately 10-15% of the students use the Prep and Learning Modules. In contrast, Compass and Accuplacer have study modules that can be purchased extra by the students. They are designed to help students prepare for the placement exam, but are not individualized to the student’s skill set.



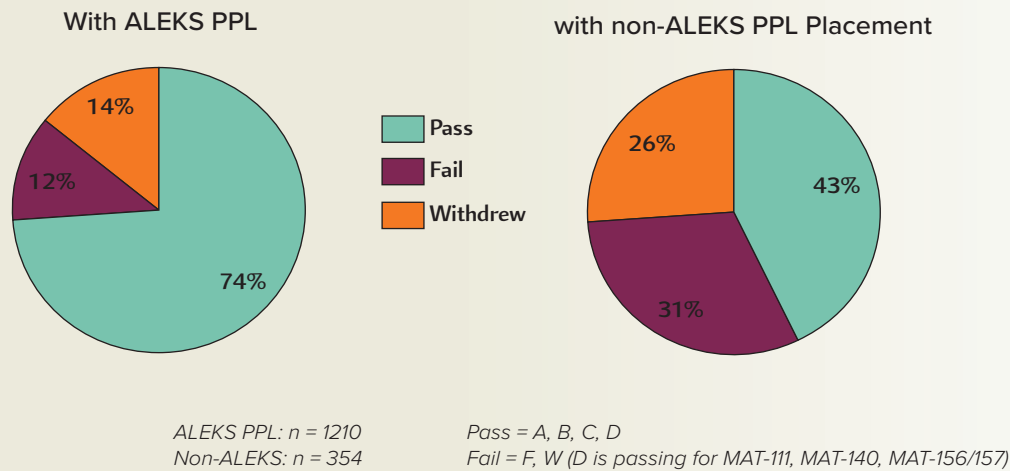
Results

Since enrollment for the fall of 2014 started in late February, approximately 50% of incoming students had already placed into courses using other placement tools, namely Compass and Accuplacer. This provided Iowa Central with a comparison group. The data shows that Accuplacer was no better than Compass at predicting student success, though the data for Accuplacer was small ($n < 100$). For the 2015-16 academic school year, students placed by their ACT scores had a failure rate of 75% across the board. Those placed by their ACT scores who were successful had an ACT score of 25 or greater.

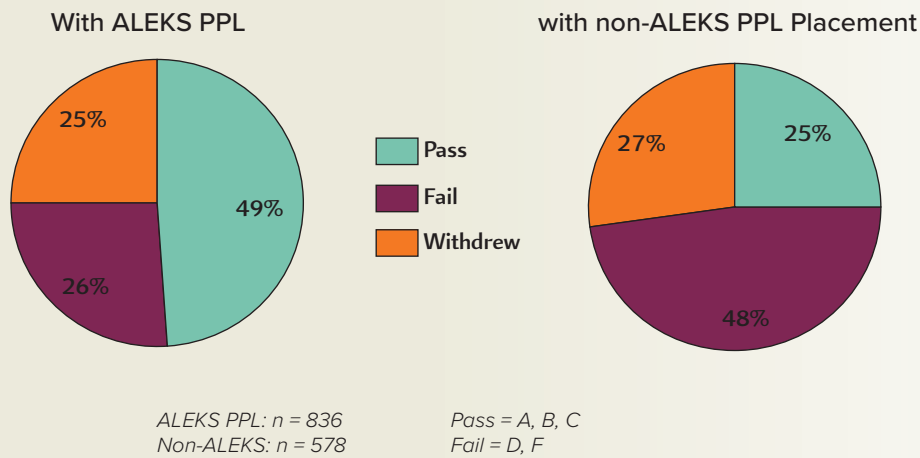
31% of the students who were placed with ALEKS PPL and withdrew from a developmental math course took ALEKS PPL again and placed in a higher-level course. The number of students enrolled in developmental math decreased from 945 (fall 2014) to 720 (fall 2016), a 24% decrease; yet math department credit hours have stayed at the same level. This also resulted in a shift of faculty teaching developmental math to teaching college-level math courses. Iowa Central has also noted an approximately 21% increase in STEM course enrollment. In the fall of 2014, 92 students spent five or more hours in their Prep and Learning Module and placed in the next level math course. Of those 92 students, 53 (58%) were successful in that course. This resulted in a savings of over \$33,000 in tuition for those students.

Figures 1-2 depict the success rates of students in college-level math courses and developmental math courses. Each figure compares students who placed into the courses with ALEKS PPL and those who placed with a non-ALEKS PPL placement tool. What’s notable is the difference between the passing rate and failure rate of both groups.

(Figure 1) College-Level Math Success Rates (2014–2016)



(Figure 2) Developmental Math Success Rates (2014–2016)



Results (Cont.)

A course-by-course analysis also shows students who placed into certain courses with ALEKS PPL had higher passing rates and lower failure rates, versus students who placed into the same courses with a non-ALEKS PPL placement tool.

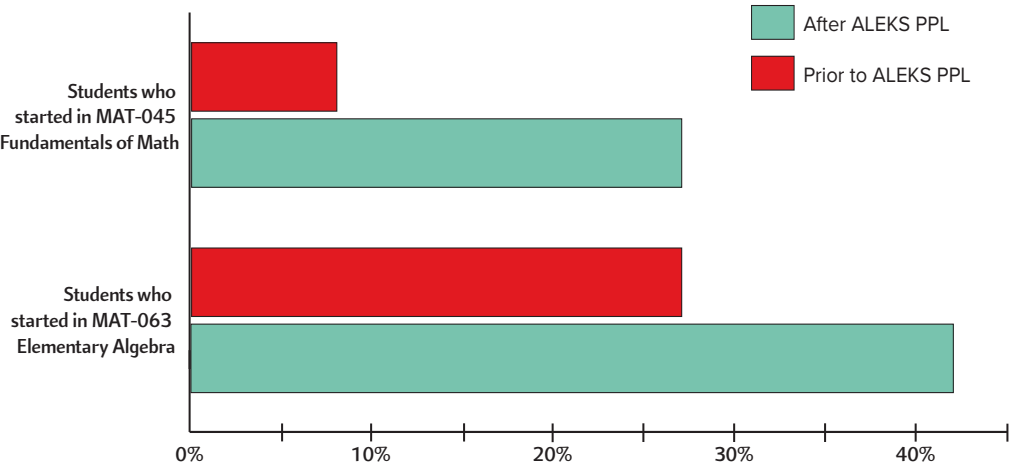
Course-by-Course Analysis

Course	ALEKS PPL Placement		non-ALEKS PPL Placement	
	PASS	FAIL	PASS	FAIL
MAT-111 Math for Liberal Arts <i>ALEKS PPL: n = 163</i> <i>Non-ALEKS: n = 79</i>	76%	24%	54%	46%
*MAT 120/127 College Alg / College Alg with Trig <i>ALEKS PPL: n = 205</i> <i>Non-ALEKS: n = 97</i>	69%	31%	29%	71%
MAT-156/157 Statistics (3 hr) / Statistics (4 hr) <i>ALEKS PPL: n = 453</i> <i>Non-ALEKS: n = 178</i>	72%	28%	46%	54%

Pass = A, B, C, D; Fail = F, W
*MAT 120/127 Pass = A, B, C; Fail = D, F, W

In the fall of 2012, Iowa Central introduced the emporium model with ALEKS PPL for the developmental math sequence, which includes MAT-045 Fundamentals of Math, MAT-063 Elementary Algebra, and MAT-102 Intermediate Algebra. Prior to this implementation, the college-level math success rate of students was 8% for those who began in MAT-045 and 27% for those who began in MAT-063. After ALEKS PPL, that success rate increased to 27% and 42% respectively (Figure 3).

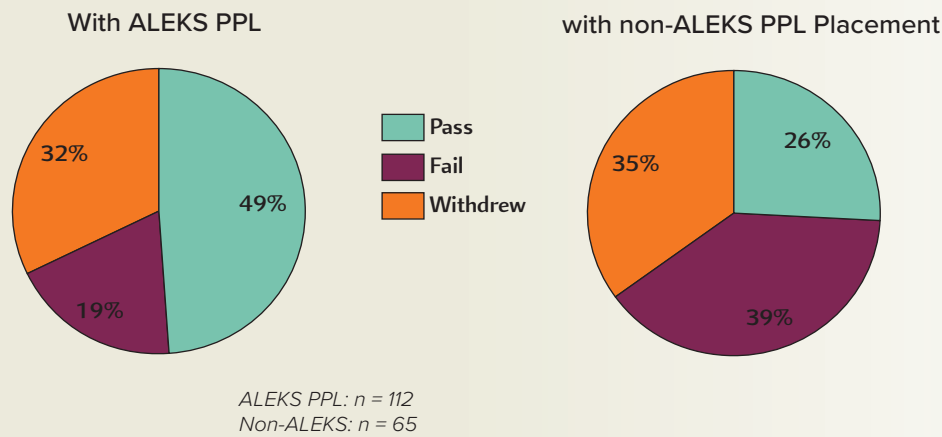
(Figure 3) College-Level Math Success Rates for Students who Started in Developmental Math Courses



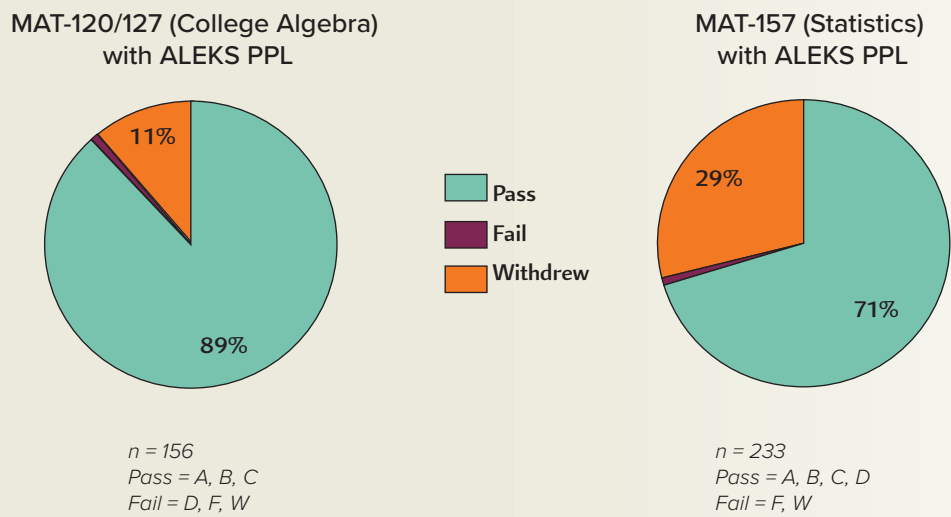
Results (Cont.)

Iowa Central also saw an increase in the success rates of non-traditional students (Figure 4) and concurrent enrollment students (Figure 5). Non-traditional students are defined as those over the age of 22 and enrolled in a developmental math course. Concurrent enrollment students are high schoolers who are enrolled in a math course at Iowa Central.

(Figure 4) Non-Traditional Student Success Rates (2014–2016)



(Figure 5) Concurrent Enrollment Student Success Rates (2014–2016)



Looking Forward

There is a state-wide initiative for using ALEKS PPL as the recommended/required placement tool for the state of Iowa. The initiative remains ongoing as of 2018. Data for this initiative comes from Iowa State University, University of Northern Iowa, University of Iowa, and Iowa Central. There is a state-wide working group trying to get ALEKS PPL used by all 15 community colleges. The Testing Coordinator from Iowa Central hosted a state-wide workshop to help other community colleges implement ALEKS PPL as we currently do in our service area. As of the 2016-17 academic year, eight out of the 15 community colleges are using ALEKS PPL. Most faculty at the area high schools who are working with the community colleges feel that placement with ALEKS PPL is a positive step forward. There were very few issues implementing ALEKS PPL at these schools.

Iowa Central is also redesigning the developmental math sequence to improve the college-level success rate and save students time and money. The ALEKS PPL outcomes are being used to design this new sequence, which will use ALEKS 360.

ALEKS[®] Case Study

The University of Toledo | Toledo, OH

Course Name: General Chemistry I

ALEKS Implementation: Placement & Remediation for Gen Chem I

Average Enrollment: General Chemistry I Fall Semester (CHEM1230) = 900-1000

Introduction

Prior to ALEKS, the University of Toledo was using multiple measures for placement into General Chemistry I: the ACS California Diagnostic Exam, high school GPA, ACT math score, and the university's own trig placement score. Each of these measures were plugged into a website created by faculty member Andy Jorgensen that could make a statistical prediction of a student's success in General Chemistry I. If the chance of achieving a C or above was 80% or higher, then the student would be allowed to enroll in the course.

It was decided the placement model with multiple measures was too complex. In the spring of 2015, the faculty, led by Andy Jorgensen, reviewed other options and decided to switch to ALEKS because they saw how well it worked as a supplement to their general chemistry course, as well as a placement program at Kent State. They also liked the convenience it provided to students.

ALEKS Experience

Using ALEKS for placement has been a major positive change. Students can now access and complete the placement exam online and do not have to visit the university to do so. The most notable impact ALEKS has had is that students who miss the cutoff are given the opportunity to earn their way into General Chemistry by working in the system to remediate and learn critical general chemistry topics.

“ALEKS has streamlined our placement exam, making it easier on the students, faculty, and advisors, without losing any effectiveness in determining who is ready to enter General Chemistry I.”

— Kristi Mock

Implementation

An ALEKS General Chemistry course was setup with 78 topics to be used for the placement tool. If students achieve 50% on the Initial Assessment, they can enroll in General Chemistry I. If the score is below this threshold, they can spend time in ALEKS to learn more topics in order to reach 50% or higher. The school's website includes a direct link to the ALEKS placement tool for easy access.

Results Achieved

In the spring of 2015, 1488 students took the ALEKS placement assessment to enroll in general chemistry for the fall. Out of the 1488 students, 700 never achieved 55% (the cutoff score). However, 83% of students who made it to the course were successful (achieved a C or higher). Additionally, there was an increase in the average ACS final scores compared to the previous fall semester (see Figure 1).

Even though the success rate rose, faculty felt that a decrease in enrollment (15%) was too much, and wanted to give more students the opportunity to be successful in the course. The cutoff score in ALEKS was lowered to 50%. Students who score below 50% are given the opportunity over the summer to remediate in ALEKS and reassess. If they reach 50% they are allowed to enroll in the course with the stipulation that they must also take the Peer Led Team Learning Supplement course.

ALEKS has also had a positive affect on the Drop/Fail/Withdrawal rates for general chemistry. Starting the year ALEKS was implemented for placement, the D/F/W rate has decreased by nearly 10% (see Figure 2). This has prompted the instructor for the Elementary Chemistry course to raise her grades and push her students harder to get into general chemistry.

Figure 1: Average ACS Final Results

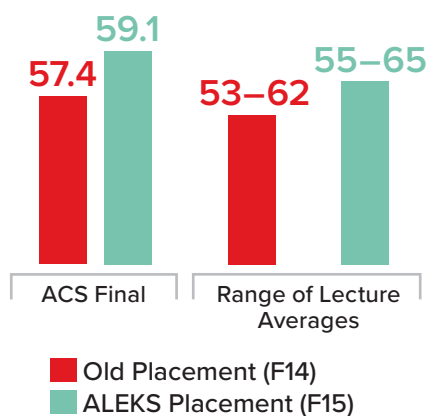
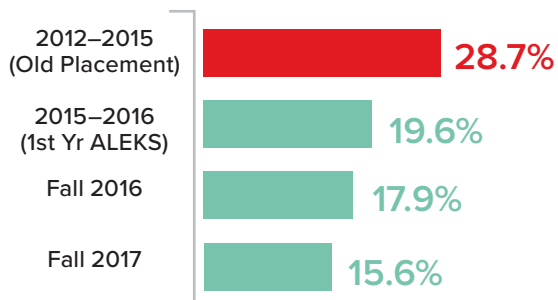


Figure 2: D/F/W Rates for Gen Chem I



Overall, the faculty believe that ALEKS as a placement tool works more efficiently than the previous complex 3-variable method, and provides more students the opportunity to succeed in general chemistry. Additionally, Toledo is looking to use ALEKS as a placement tool for the GOB course.



Institution Profile

The University of Toledo is a student-centered, public metropolitan research university that serves approximately 20,000 students. It offers more than 300 undergraduate, graduate, and professional programs.

Instructor Profile



In graduate school, Kristi's focus was on analytical chemistry. There she worked on choline modified quantum

dots and beta-cyclodextrin gold nanoparticles for chiral separation. Since then she has been teaching mainly first-year chemistry courses at the University of Toledo. Kristi was instrumental in getting ALEKS adopted at the University.

ALEKS[®] PPL Case Study

PLACEMENT, PREPARATION AND LEARNING

Utah Valley University | Orem, UT

Introduction

Prior to using ALEKS, UVU placed students into math courses using a variety of measures, each with a two-year expiration: ACT math subscore, Accuplacer, and UVU prerequisite course grades. We faced several challenges in our curriculum and success rates based on this setup. We had a sequence of four developmental math courses that students took before reaching a course that counted for general education (gen ed) math requirements. General education math requirement can be fulfilled by MATH 1050/1055 College Algebra, STAT 1040/1045 Intro to Statistics, and MAT 1030/1035 Quantitative Reasoning. Thousands of students took two years or more of developmental math courses before reaching a course that counted for graduation. Failure rates in all developmental math courses and the general education math courses were around 35%, including withdrawals, failing grades, and D grades.

Also, the state of Utah has a high number of young people (aged 18-21) who leave for two years of religious service, and need to re-establish their placement in math courses upon return. These students were routinely placed into low-level developmental math courses by Accuplacer and ended up retaking multiple math courses before enrolling in a course that counted for general education math credit.

Additional challenges we faced were inconsistent Accuplacer results (a student could test on consecutive days and get vastly different placement results) and Accuplacer rarely placing a student into college algebra. Approximately 70% of incoming students were deemed not ready for college-level math based on Accuplacer results. Students were at widely different levels of preparation and readiness for the courses into which they were placed. The curriculum in the developmental courses contained significant overlap due to necessary review material to help less-prepared students become ready for the material being taught.

“ALEKS PPL has been a game changer for our campus. Students are now routinely placing directly into credit-bearing math courses after working in the prep and learning modules. Students don’t need to repeat entire courses when their math skills are rusty; they need a focused refresher to help them brush off their skills and move forward.”

– Tiffany Evans, Carolyn Hamilton



Implementation

Initial Pilot

From the summer of 2015 through the spring of 2016, UVU began using ALEKS for placement with two small pilot groups. (Pilot #1) During the summer of 2015, 50 students who had placed into intermediate algebra were invited to take a 3-week refresher course using ALEKS Prep for College Algebra. (Pilot #2) During Spring 2016, UVU contacted 35 students who had dropped out of the university with all credits toward graduation completed except a liberal arts gen ed math course. A six-week Math Completion night workshop was created with ALEKS PPL to help these students refresh their math skills and place into a gen ed math course to finish their degrees.

We used money reserved for Math Initiatives on our campus to pay for a few faculty to teach the pilot sections of ALEKS PPL math refreshers. Students paid the cost of their own ALEKS PPL access through a workshop fee. In May of 2016 we expanded ALEKS PPL use for multiple math boot camps throughout the summer.

In the 2016-2017 academic year, UVU began offering ALEKS PPL widely across campus, though Accuplacer was still available if students requested it by name. The university broadened its investment to cover the cost of ALEKS PPL for all incoming freshmen one time. Students could purchase additional access (to a student-paid cohort) at their own expense.

In the fall of 2017, ALEKS PPL replaced Accuplacer as the math placement tool for all of campus and the university expanded institution-paid access to ALEKS for all students – current, incoming, and transfer – having less than 45 UVU credit hours. Other students have access to a self-paid cohort. While Accuplacer is no longer available to UVU students, it is still used at the high schools for students taking concurrent enrollment math courses through UVU. However, there is a state-wide proposal to use ALEKS PPL in Utah high schools as well. We also still use ACT math subscores of 26 or higher for placement into courses beyond college algebra. We are waiting on a decision from the Utah System of Higher vEducation on using ACT math subscores for placement into common state-wide courses.

Cut Scores

After establishing the initial cut scores for ALEKS PPL, we realized we needed to adjust our course offerings and curriculum. First, the four developmental math courses (MAT 920, 950, 990, and 1000) quickly became two developmental courses when we saw that placement differed by only a few points in ALEKS. Those few points could be achieved by students in less than three weeks of guided review.

It also became clear that students on the cusp of the cut score for ged ed classes did not need to take a four or five credit hour developmental course to become ready for college-level work; they only needed some targeted review. As a result, UVU implemented the corequisite courses of MAT 1035 (Quantitative Reasoning), STAT 1045 (Statistics), and MATH 1055 (College Algebra) that add additional credit hours onto the corresponding general education course, and use the extra credit hours for review. These three different pathways (quantitative reasoning, statistics, and college algebra) need different topics from intermediate algebra to be emphasized, hence the three corequisite offerings.

UVU Course	Initial Cut Score	Current Cut Score
MAT 920 Math Fundamentals	0-5	N/A
MAT 950 Foundations of Algebra	6-12	0-18
MAT 990 Introductory Algebra	13-18	N/A
MAT 1000 Integrated Beginning & Intermediate Algebra	19-29	19-29
MAT 1010 Intermediate Algebra*	30-45	30-45
MAT 1035 Quantitative Reasoning with Integrated Algebra	N/A	19
STAT 1045 Introduction to Statistics with Algebra	N/A	32
MATH 1055 College Algebra with Preliminaries	N/A	38
MATH 1030 Quantitative Reasoning	46	46
STAT 1040 Introduction to Statistics	46	46
MATH 1050 College Algebra	46	46
MATH 2010 Math for Elementary Teachers I	61	61
STAT 2040 Principles of Statistics	61	61
MATH 1060 Trigonometry	61	61
MATH 1100 Introduction to Calculus	61	61
MATH 1210 Calculus I	76	76

*Credit-bearing, but does not fulfill the gen ed math requirement

Current Setup

ALEKS PPL is now used to place all students who have not taken a math course for more than two years, have an ACT math subscore more than two years old, or who want to improve math placement.

Students are allowed five attempts at the ALEKS PPL assessment; only proctored assessments are considered official. The first three attempts can be taken un-proctored. The last two attempts must be proctored so that students don't unwittingly use all their attempts without establishing official placement.

Students are required to spend three hours in the ALEKS Prep & Learning Module between proctored assessments. If a student took an un-proctored assessment at home, they can take a proctored assessment for official placement without doing the three required hours in the Prep & Learning Module.

The key component of UVU's implementation of ALEKS PPL is the creation of a 1.0 credit hour course called MATH 100R Math Leap, which is a guided placement preparation course taught by full-time math faculty. The course is offered each block (7 ½ weeks) of every semester, including summer semesters. Class size is capped at 40 students per section. Advisors recommend students take MATH 100R during their first semester instead of attempting to take a regular math course.

On the first day of MATH 100R, students take a proctored ALEKS PPL assessment in class. The curriculum of the course is ALEKS PPL. Students must work for at least six hours per week in the Prep & Learning Module to receive credit for the course. The course is graded as credit/no credit.

During class, instructors help students with questions and guide them through general problem-solving activities that are not algebra dependent. The instructors also meet with students individually on a weekly basis to track their progress. Students are also advised regarding the math requirements for their major, the corresponding ALEKS score needed, and the amount of time it will require in ALEKS to achieve that score. On the last day of class, students take another proctored ALEKS PPL assessment and are advised about their math pathway to graduation.

Results

Of the 50 students in the Summer 2015 pilot, 24 (48%) placed into college algebra and of those, 80% passed their college algebra course with an average grade of B. For the Spring 2016 pilot, UVU contacted 35 students who had left the university years before and had all requirements completed except gen ed math. Of those students, 22 (63%) were placed into a gen ed math course after using ALEKS and graduated within six months.

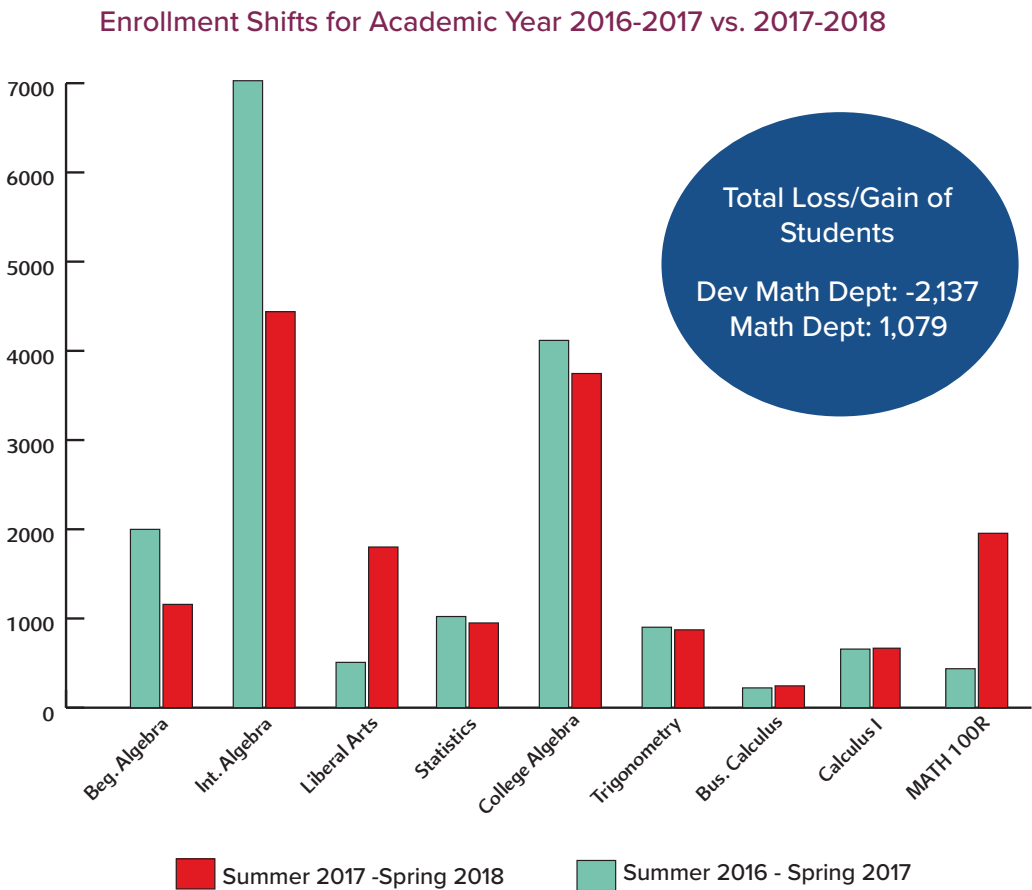
For the Fall 2017 MATH 100R class, students worked an average of 30.1 hours in their Prep and Learning Modules and mastered approximately 105 topics. They also improved their placement scores by an average of 15 points, eliminating the need for least one course of four or five credit hours, on average. MATH 100R is now the standard for math placement on our campus.

Academic Term	MATH 100 Enrollment	MATH 100 No. of Sections
Fall 2016	156	11
Spring 2017	281	13
Summer 2017	103	4
Fall 2017	965	28
Spring 2018	886	32



Institution Profile

Utah Valley University is a public university located in Orem, Utah that serves approximately 37,000 students annually. Founded in 1941, it is the largest public university in the state of Utah and offers numerous certificate and diploma programs, as well as associate degrees, bachelor's degrees, and master's degrees. Throughout its history, UVU has responded to its service region's (Utah, Wasatch, and Summit counties) population changes and business/industry needs, which is evidenced in its mission, program offering, degree level, and enrollment changes.



Using ALEKS PPL has saved students approximately \$992,073 in tuition by helping them to skip math courses that would otherwise have impeded their academic track; we continue to evaluate the financial impact overall. UVU has seen enrollment shifts from developmental math courses to general education math courses. Total math instruction for the 2017-18 academic year is 8,000 student credit hours less than for the same period in 2016-17.

Knowing that college completion is affected by time spent in developmental math courses, we expect our students to persist to graduation at higher rates now that the path to general education math courses is shorter, and students start at a (higher) level appropriate to their abilities. We will continue to monitor student retention.

Instructor Profiles

Tiffany Evans is the Director of Program Completion in the Division of Academic Affairs at Utah Valley University. She has 25 years of experience in higher education administration including 15 years at Utah State University as Executive Director of Student Involvement and Leadership. She is passionate about programs that will help students achieve their goals in higher education at open-admissions institutions.

Carolyn Hamilton, Associate Professor, has taught mathematics at UVU for 25 years, including chairing the Math Department for several years. Her deep concern for student success led to the implementation of innovative refresher workshops for re-entry students and a program for mass advising for math courses. She is currently the business calculus coordinator in the Department of Strategic Management and Operations. She received her M.S. in Mathematics from University of California Riverside, specializing in Complex Analysis.

www.mheducation.com/highered/aleks

Contact: maryellen.rahm@mheducation.com

